

COLUMBIA UNIVERSITY
COLLEGE OF PHYSICIANS
AND SURGEONS

REPORT OF A COMMITTEE
OF THE MEDICAL FACULTY

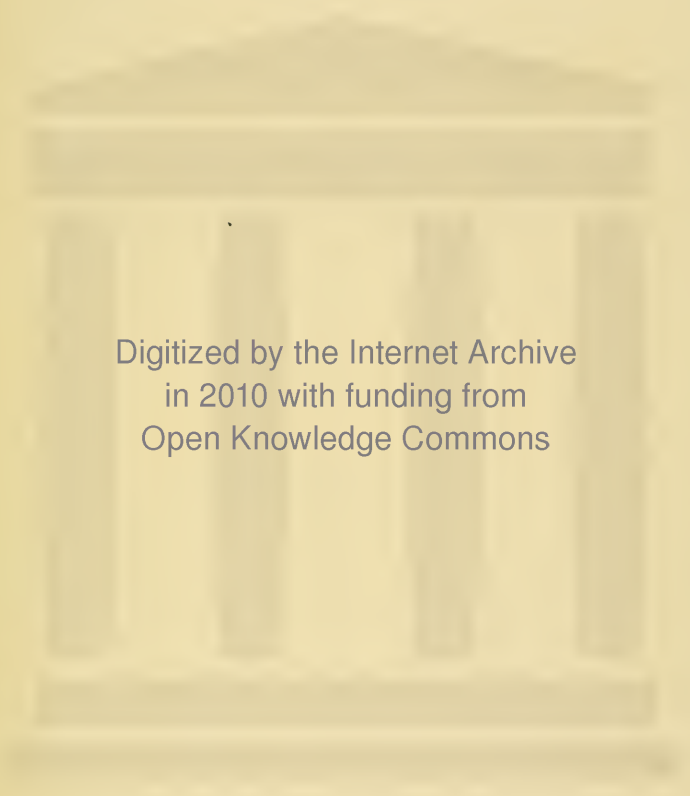
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REPORT OF A COMMITTEE OF THE
MEDICAL FACULTY
IN
COLUMBIA UNIVERSITY

Appointed to Study the Ways and
Means of Improving Medical Edu-
cation with Special Reference to the
College of Physicians and Surgeons

SECTION I.

REPORT OF A COMMITTEE OF THE MEDICAL FACULTY IN COLUMBIA UNIVERSITY APPOINTED TO STUDY THE WAYS AND MEANS OF IMPROVING MEDICAL EDUCATION WITH SPECIAL REFERENCE TO THE COLLEGE OF PHYSICIANS AND SURGEONS.

SECTION 1.

PURPOSES AND PERSONNEL OF THE COMMITTEE

This Committee was appointed by the Dean of the Medical School to study medical education, particularly that in vogue in the College of Physicians and Surgeons. It proposed to make a critical review of the present courses of instruction including their subject matter, correlation and methods of teaching. As a result of this survey it was hoped that certain suggestions might be offered for improving the entire medical course of study by a revision of the present schedule and methods for the benefit of the students.

The Committee was appointed in October, 1920, by Dean Darrach. It comprised Dr. William Darrach, chairman, Dr. James Alexander Miller, Dr. Albert Lamb, Dr. J. W. Jobling, Dr. Sidney R. Burnap and Dr. Frederick Tilney, secretary. The meetings of the Committee were held bi-monthly, often in consultation with Professor W. H. Kilpatrick, Professor of the Philosophy of Education in Teachers College of Columbia University.

In accepting this invitation to consult with the Committee, Professor Kilpatrick has made himself responsible for the soundness of those educational fundamentals which the Committee, under his advice, accepted as a basis for their critical survey of existing practices in medical education. To his direction must be credited the adoption by the Committee of certain psychological laws upon which they hope to base their recommendations for changes in the matter and method of teaching. For his careful consideration of their aims, for his courteous cooperation in their efforts and, above all, for his instruction and guidance in the matter of educational principles the Committee owes to Professor Kilpatrick a debt which cannot be overestimated.

TRENDS IN AMERICAN MEDICAL EDUCATION-HISTORICAL NOTE NOTE

In reviewing the history of medical education in America, the Committee was impressed by the fact that apparently little sustained consecutive deliberation had been devoted to this important matter. Although medical education in this country seems to be instinctively striving in the right direction, it has been and still is handicapped by many difficulties. It has been embarrassed by the dearth and improper organization of clinical facilities; it has been encumbered by archaic doctrines of education; it has been retarded by a lack of the thought and study which its best interest obviously demands.

A brief glance at the development of medical education in America will illustrate

this point. For convenience of discussion three more or less distinct historical periods may be recognized; namely, the *Preceptorial Period*, the *Didactic Period* and the *Curriculum Period*.

In the *Preceptorial Period* there were five medical schools in the country, connected with universities, in which short courses of lectures were given. The medical student had, however, in addition to this inadequate instruction, the opportunity of being connected with a practitioner of medicine who officiated as his preceptor. The student thus gained a considerable contact with the details of medical practice and acquired much valuable clinical experience.

In the early part of the nineteenth century the preceptorial custom was discontinued due to the stress of competition. Many inferior medical schools then came into existence, maintaining a low standard of instruction and giving students little more than the nominal course of lectures then requisite to the degree of medicine.

Although the early preceptorial system offered opportunity to study clinical medicine by the case method, this study was at best but fragmentary and not intelligently calculated to present the student with a real basis of medical philosophy.

In the *Didactic Period* even this feeble effort to introduce the student directly to the subject material of his study seems to have failed. Instruction depended upon a more extensive course of lectures which were, however, largely theoretical even in the clinical branches. The majority of the schools of that period had few clinical facilities, and hospital work was accessible only to those who obtained positions as internes or externes. Private preceptors and quiz masters were employed by students who could afford it during their medical courses. Even under these circumstances the student was compelled to learn, more or less by rote, the books on medicine rather than medicine itself in the living subject. In some instances this didacticism took a more brilliant turn and brought the student at least into sight of his living material through the so-called *clinical lecture*. But on the whole this was a period characterized rather by the exploitation of professorial personality than by the encouragement of teaching efficiency.

In the present *Curriculum Period*, although much thought has been given to medical education, it has been largely confined to lengthening the course, rearranging the studies, raising entrance requirements and complying with certain regulations imposed by the State Boards. Thus what was deemed a real reform in medical education was made by Charles Eliot in 1871, when he raised the entrance requirements for the medical school of Harvard University and lengthened the curriculum to three years. This change also occasioned a rearrangement of courses in such a way as to provide facilities for clinical and laboratory instruction. In 1880 the three years' course of nine months each in Harvard was extended to four years. Other institutions of the country followed this example, and it is now a nation-wide regulation that the medical course in all recognized schools shall consist of four years of at least eight months each.

Although considerable attention has been given to the course of medical education by the universities, independent medical schools, the Association of American Medical Colleges and the Council of the American Medical Association, the net result of these deliberations to date has been mainly a rearrangement of the curriculum with special emphasis on the apportioning of time to the different departments and courses. Moreover, certain regulations were established which were desirable and necessary to meet the conditions existing several years ago. But these regulations are now recognized—as was shown at the meeting of the Association of Medical Colleges in Chicago in 1921—as a handicap to the free development of individual schools to meet their special problems.

There has been a great deal of *curriculum tinkering* with little constructive thought given either to the subject matter of the courses or the methods of instruction.

One notable exception, however, should be mentioned in this connection; namely,

the effort to establish a real contact between the students and clinical material as conceived and administered in the so-called clinical clerkships of the fourth year, and in the third year dispensary courses in medical and surgical diagnosis. Aside from these worthy innovations, the departmental courses throughout the four years still lack coordination, and correlation between the courses in different departments has not been secured. No definite arrangement has yet been made to allocate topics, or parts of topics, among the departments. Each chooses for itself with consequent confusion and overlapping as the result. In addition to this is the regrettable fact that the first two years of medicine, as taught at present, are practically devoid of any direct clinical pertinence and may justly be counted as two years of science—two long years of study that afford the student no opportunity for satisfying his desire to apply the knowledge gained.

The best that can be said of all the curriculum tinkering of the past twenty years is that it has devised a chronological system by means of which to fill the student's time completely. From the educational standpoint this is mistaken in its intention and unsatisfactory in its results. It does not take into account the student's keen desire to apply his acquired knowledge at the earliest possible moment. It gives too much attention to the convenience of institutional schedules and not enough to the opportunities for learning.

Now, to secure the best results, the method of teaching medicine or any other applied science must be formulated in agreement with certain principles which facilitate the process of learning, before the required topics are allocated and the available time is apportioned to each. And, because the acquisition of knowledge is an individual attainment based upon the function of learning, educational methods must be developed according to the laws of learning.

The first essential in successful teaching, then, is the recognition of these so-called "Laws of Learning." They embody a statement of the psychological conditions most favorable for the acquisition of knowledge. And it must be understood that these laws have been formulated from the experience of teachers who have made it their business to study the conditions under which knowledge is most readily and satisfactorily acquired and most effectively retained. These laws the Committee deems of such importance that it has included a brief summary of them in the following paragraphs:

THE LAWS OF LEARNING

1. *The Law of Readiness.* This law states that the process of learning is facilitated if the neural associations are ready for it in advance; i. e., if the receiving mechanism is prepared or set for the specific subject or situation. This readiness depends not only upon the desire to learn but also upon the pertinence of such learning to a definite goal toward which the desire is directed. For example, when *we*, ourselves, desire to learn about a specific topic, one method is to search the literature. What we read may make no impression until we meet some statement pertinent to our special problem. This statement then immediately fixes our attention. It is grasped and retained. Our receiving mechanism was prepared or set for that specific information.

Failure to appreciate this law is seen when we require the beginning medical student to learn by rote the description of a bone apparently quite unrelated to his existing desire to know how to treat a fracture. His neural associations are ready and set for the study of medicine and should be taken into account. His readiness is based upon the desire to understand the nature of *disease and injury* so that he may treat them. This incentive, already existing, stimulates his interest and holds his attention, provided he is convinced that the topic under discussion is pertinent to his desire. If, on the other hand, he is not permitted from the first to keep his goal in sight, the pertinence of his learning loses direction, vital interest in the

subject flags, and the desire to learn is displaced by such motives as mere personal ambition or satisfaction in the mastery of difficult tasks. These motives are irrelevant to his object. They are more calculated to develop control of conduct than to stimulate achievements in learning.

In order, therefore, to maintain the favorable set or readiness which facilitates learning, it is necessary to keep the student conscious of the goal which he seeks, and to convince him of the pertinence of his efforts to reach this goal.

2. *The Law of Effect.* This law recognizes that the neural bonds of learning are strengthened if the mental process produces a sense of satisfaction. The strengthening of these bonds facilitates learning. If, for example, a medical student performs an experiment which is technically perfect and completely satisfactory, his neural bonds of learning from this experiment are strengthened; that is, they are much more likely to retain and make adequate appropriation of the associations arising from the experiment, than if the latter had proved to be a failure. Satisfaction of this kind varies; its maximum degree is attained, according to the Law of Readiness, only when the knowledge acquired has a direct and pertinent bearing upon the subject for which the student is set or ready. If the student understands that the experiment he has just performed will be of direct service to him in medicine, his effort in learning will be attended by a satisfaction approaching the maximum. On the other hand, if the efforts to learn are accompanied by a sense of annoyance, the neural bonds are weakened. Thus, if the student is provided with defective instruments and inferior material as factors in a given experiment; if his results are inconclusive or the entire procedure appears to have no pertinent bearing upon medicine, his reaction to the situation is one of dissatisfaction and the facility in learning is reduced in proportion.

The Law of Effect in learning, therefore, emphasizes the necessity of maintaining a reaction of satisfaction in the student toward his work. It indicates that satisfaction in learning depends in great measure upon the effectiveness with which the teacher provides the student with the proper opportunities to learn.

3. *The Law of Exercise.* This law recognizes the fact that the neural connections are strengthened by proper repetition at sufficiently short intervals. It also recognizes that improper repetition may weaken these bonds, particularly if the repetition be in opposition to the Law of Effect and produce a sense of annoyance. Other things being equal, it is fair to presume that repetition cannot fail to increase learning, and the more frequent the contact which the student has with the same or closely allied situations and conditions, the more effectively is the opportunity for learning put at his disposal. Repetition, to be effective, must not only be adequate and proper; it must have due regard for the pertinence and relative importance of the subjects presented. It may therefore be employed with advantage by different departments whose subjects have overlapping boundaries. For example, in the study of the heart, the morphology of this organ may be taken up simultaneously with its physiology, thus giving much pertinent repetition in these two closely allied aspects of the study. It is possible that other departments might enter into such a cooperation and contribute still further to the illumination of the subject. *In the application of the Law of Exercise to medical education, it is evident that this purpose to coordinate courses and provide a variety of repetition from several different points of approach is of the highest importance.*

EXTENT TO WHICH LAWS OF LEARNING HAVE BEEN HITHERTO APPLIED IN MEDICAL EDUCATION

With the laws of learning in mind, we may properly ask ourselves whether we have employed them as our guides. We may go even farther and inquire—has the medical course taken cognizance of these laws at all? Considering first the Law of Readiness, it would appear that we have disregarded it almost entirely.

The medical student who enters upon his course in response to a desire to be of service to those who suffer from disease or injury, comes with his mind preadjusted to attain a definite goal, namely the understanding and proficiency necessary for the care of the sick. For the first two years his efforts are limited to the details of certain fundamental scientific subjects which are treated as pure sciences shut off from contact with clinical material. The student wonders why he is so long restrained from gaining actual experience in the subject upon which his mind is set. He often asks why his efforts are confined to anatomy, physiology and chemistry during his first year when he desires to learn about disease. How much can he learn about disease through the microscope when he never sees a patient? He wants first-hand knowledge and he wants to learn it under conditions in which he expects to use it. He is reluctant to accept the assurance of his instructors that all this preliminary work is sanctioned by tradition as part of his mental training. He may reply that he seeks medical as well as mental training and such a point is certainly well taken. It is supported by the opinion of the European Medical Commission which investigated medical education in the United States, last year, as guests of the National Board of Medical Examiners. They recognized the fallacy in divorcing, so completely as we have, the study of scientific principles from their practical application.

We ourselves recognize that the present arrangement of the curriculum is not in harmony with the first Law of Learning (Law of Readiness). By neglecting to take into the account the desire of the student for direct contact with the patient, the course imposes a discouraging handicap and affords a poor method of approach.

How little we apply the second Law of Learning (Law of Effect) may be appreciated by the number of students' complaints each year concerning the course of instruction. These complaints are by no means all of them captious or mere fault-finding. The majority of them do not represent a recognized tendency among students towards a defensive reaction against their instructors. There is justice and validity in many of the objections. In substance the complaints concern nearly every department to some extent. They embody objections to the methods of instruction because they are inadequate or insufficient; to the disproportion in the amount of instruction given in the different departments, and they especially emphasize the scarcity of opportunities for the study of clinical material. There are also objections to the disposition of the students' time much of which is wasted in what seems to be unnecessary transportation from one institution to another; and to the overcrowded schedule which gives too little free time for collateral reading. All of these objections illustrate dissatisfaction and annoyance which are in direct violation of this Law of Effect.

A number of examples might be cited to show that we have given little attention to the Law of Exercise, especially as it bears upon the possibilities of inter-departmental cooperation.—e.g. During a certain period of the third year course the subject of the endocrines was so stressed, by all departments, as to give rise to dissatisfaction among the students which resulted in open criticism of this form of repetition. This lack of coordination needs no further comment. It demonstrates to what degree of tedium and annoyance the student's endeavor to learn may be subjected.

WHAT MEANS MAY BE EMPLOYED TO BRING MEDICAL EDUCATION IN CLOSER HARMONY WITH THE LAWS OF LEARNING

The need of improvement in our medical course is evident to the teaching staff of the College of Physicians and Surgeons, and is recognized by medical teachers in other institutions. Steps in this direction should be taken—as soon as

possible, and especial efforts should be made to avoid the unprofitable expedients of the past which have been confined to curriculum readjustments. *Such rearrangements are of relatively little importance unless the principles of learning are made a fundamental basis of revision in medical education.*

Much may be done in the way of improvement, provided all of the instructors active in the different departments will give the subject careful thought, keeping in mind the main theme, namely, the construction of a course in medicine which will provide the student with the most favorable opportunities for learning.

It is apparent at once that the defect caused by deferring contact with clinical material until the third year indicates a failure to recognize that medicine is an applied science. This defect may be easily overcome by the early introduction of the student to clinical material, by permitting him to see the pertinence of his studies during the first and second years in their direct bearing upon injury and disease. There can be no doubt that the most effective medical text and the best medical teacher is the patient. The courses in the first and second years need such rearrangements as to permit the introduction of illustrative material of this kind. A detailed plan for such rearrangement has already been devised and will soon be submitted to the medical teachers of the school under Sections IV and V of this report.

Much improvement may be provided in methods of instruction. The medical student desires and needs to *learn* medicine. Our methods of teaching should aim primarily to meet these desires and needs. In selecting the most effective methods the critical distinction between *information* and *knowledge* must be recognized. It is possible to impart much useful information concerning disease and injury through didactic exercises and text books, but actual knowledge of these subjects may be acquired only by contact with patients and clinical material. The desirable method of teaching would, therefore, aim to combine adequate clinical opportunities for learning with the proper amount of didactic instruction. It is desirable that this method be so applied as to draw a sharp distinction in the student's mind between what is knowledge and what is information, between what he knows for himself and what he has either heard or read concerning the facts. The course of education which fails to make this distinction fails to give the student a critical insight concerning the relative values of his intellectual possessions.

The coordination of the courses in the several departments to provide the most ample opportunity for learning, is another problem requiring earnest deliberation and wise selection.

A BRIEF OF THE ESSENTIALS FOR SUCCESSFUL TEACHING IN MEDICINE

FIRST LAW OF LEARNING

1. There exists in the student's mind a desire to understand disease and injury in order to be able to treat it.
2. There should constantly exist in the instructor's mind a recognition of this desire of the student.

APPLICATION OF FIRST LAW

3. The relation of the topic presented—not only to disease or injury but also to the desired ability to treat the disease or injury—must never be allowed to completely disappear.

SECOND LAW OF LEARNING

4. There should be a reaction of satisfaction in the student toward his work.

APPLICATION OF SECOND LAW

5. Each exercise should be so planned that the student will feel that he has gained from it knowledge which is pertinent to the object of his desire.

THIRD LAW OF LEARNING

6. Repetition of each topic should be provided for wherever proper and pertinent.

APPLICATION OF THIRD LAW

7. Repetition should be arranged, so far as possible, to exhibit the natural connections of each topic with other similar topics, so that the association and repetition may facilitate the final conscious retention of the related facts.

The Committee, in this introduction of its report, presents what it feels to be the fundamental principles necessary to the critical study of medical education. *It especially requests that every teacher in the medical school carefully review this protocol, giving the matter his earnest attention, and making such criticisms or comments as seem to him warranted.*

Further details of the work of the Committee will be issued subsequently under the following Sections:

Section II. Schedule and method of teaching for the Fourth Year and the desirability of the addition of a Fifth Medical Year.

Section III. Method of teaching, schedule and content of courses in the Third Year necessary to preparation for the Fourth Year.

Section IV. Method of instruction, material, content of courses and schedule in the Second Year necessary to preparation for the Third Year.

Section V. Method of instruction, material, content of courses and schedule in the First Year necessary to preparation for the Second Year.

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